

## CLAIMS

1. A configurable lookup table extension system, comprising:  
a plurality of lookup tables arranged in a first memory;  
a second memory; and  
a flexible controller configured to couple at least one of the plurality of lookup tables to the second memory through a single memory interface.
2. The configurable lookup table extension system of claim 1, wherein:  
the first memory includes internal memory; and  
the second memory includes external memory.
3. The configurable lookup table extension system of claim 2, wherein:  
the first memory includes static random access memory (SRAM); and  
the second memory includes dynamic random access memory (DRAM).
4. The configurable lookup table extension system of claim 2, wherein:  
the first and second memories include static random access memory (SRAM).
5. The configurable lookup table extension system of claim 1, wherein:  
the plurality of lookup tables includes Internet Protocol (IP) and Media Access Control (MAC) type tables.
6. The configurable lookup table extension system of claim 5, wherein:  
the plurality of lookup tables further includes IP MultiCast (MC), IP Next Hop Table (NHT), and IP Longest Prefix Match (LPM) type tables.
7. The configurable lookup table extension system of claim 1, wherein:  
at least one of the plurality of lookup tables is configured for packet processing;  
the second memory is arranged as a plurality of banks; and  
the flexible controller includes an access queue configured to couple a packet access to at least one of the plurality of banks.
8. The configurable lookup table extension system of claim 1, wherein:

the single memory interface includes a plurality of data and address signals.

9. The configurable lookup table extension system of claim 1, wherein:  
the second memory includes a plurality of table allocations, each table having a configurable depth and a configurable width.
10. The configurable lookup table extension system of claim 9, wherein:  
the plurality of table allocations includes at least one table having the configurable width span across a space designated for at least two channels.
11. A method of extending a lookup table, comprising:  
arranging a plurality of lookup tables in a first memory;  
providing a second memory; and  
flexibly controlling a coupling of at least one of the plurality of lookup tables to the second memory through a single memory interface.
12. The method of extending the lookup table of claim 11, wherein:  
the first memory includes internal memory; and  
the second memory includes external memory.
13. The method of extending the lookup table of claim 12, wherein:  
the first memory includes static random access memory (SRAM); and  
the second memory includes dynamic random access memory (DRAM).
14. The method of extending the lookup table of claim 13, wherein:  
the first and second memories include static random access memory (SRAM).
15. The method of extending the lookup table of claim 11, wherein:  
the plurality of lookup tables includes Internet Protocol (IP) and Media Access Control (MAC) type tables.

16. The method of extending the lookup table of claim 15, wherein:  
the plurality of lookup tables further includes IP MultiCast (MC), IP Next Hop Table (NHT), and IP Longest Prefix Match (LPM) type tables.
17. The method of extending the lookup table of claim 11, wherein:  
at least one of the plurality of lookup tables is configured for packet processing;  
the second memory is arranged as a plurality of banks; and  
the flexible controller includes an access queue configured to couple a packet access to at least one of the plurality of banks.
18. The method of extending the lookup table of claim 11, wherein:  
the single memory interface includes a plurality of data and address signals.
19. The method of extending the lookup table of claim 11, wherein:  
the second memory includes a plurality of table allocations, each table having a configurable depth and a configurable width.
20. The method of extending the lookup table of claim 19, wherein:  
the plurality of table allocations includes at least one table having the configurable width span across a space designated for at least two channels.
21. A means for extending a lookup table, comprising:  
a means for arranging a plurality of lookup tables in a first memory;  
a means for providing a second memory; and  
a means for flexibly controlling a coupling of at least one of the plurality of lookup tables to the second memory through a single memory interface.